Name: SOLUTIONS

# Quiz 3

201-922-DW (Introduction to Statistical Methods)
Instructor: Émilie Richer (Department of Mathematics)
November 16th 2016 (Worth 4% of final grade)

(a) Leo 4948 seconds $\mu = 4313$ $\sigma = 583$

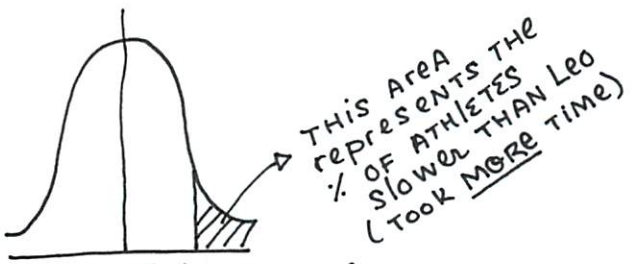
$$Z_{leo} = \frac{4948 - 4313}{583} = \frac{635}{583} = 1.09$$

Mary 5513 seconds $\mu = 5261$ $\sigma = 807$

$$Z_{Mary} = \frac{5513 - 5261}{807} = \frac{252}{807} = 0.31$$

(b) Mary did better because although both Leo & Mary ran slower than the average of their respective groups, Mary was closer to her group's average.

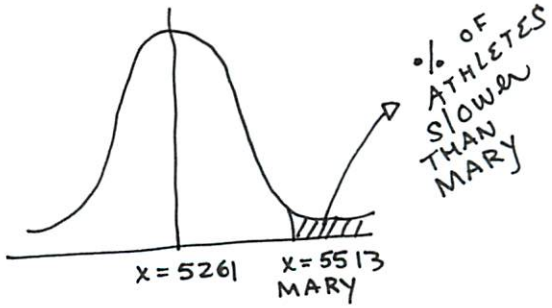
(c)




$P(Z \geq 1.09) = 1 - 0.8621$
$= 0.1379$

Leo did better than 13.79% of triathletes

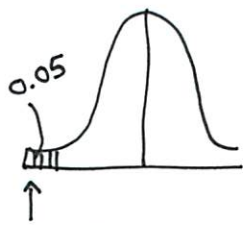
(d)




$P(Z \geq 0.31) = 1 - 0.6217$
$= 0.3783$

Mary did better than 37.83% of triathletes

(e)



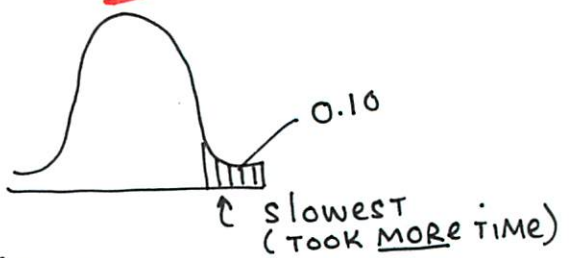

$Z = -1.64$

$$-1.64 = \frac{x - 4313}{583}$$

$x = 3356.88$

The cut-off time is 3356.88 seconds

(f)




$Z = 1.28$

$$1.28 = \frac{x - 5261}{807}$$

$x = 6293.96$

# Quiz 3 Question

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[**Question 1**] (From Open Intro to Statistics #3.4 & 3.6)

In triathlons, it is common for racers to be placed into age and gender groups. Friends Leo and Mary both completed the Hermosa Beach Triathlon, where Leo competed in the Men, Ages 30-34 Group while Mary competed in the Women, Ages 25-29 Group. Leo completed the race in 1:22:28 (4948 seconds), while Mary completed the race in 1:31:53 (5513 seconds). Obviously Leo finished faster, but they are curious about how they did within their respective groups. Can you help them? Here is some information on the performance of their groups:

- The finishing times of the Men, Ages 30-34 Group has a mean of 4313 seconds with a standard deviation of 583 seconds.
- The finishing times of the Women, Ages 25-29 Group has a mean of 5261 seconds with a standard deviation of 807 seconds.
- The distributions of finishing times for both groups are approximately Normal.

Remember: **a better performance corresponds to a faster finish.**

(a) What are the Z-scores for Leo's and Mary's finishing times? What do these Z-scores tell you?

(b) Did Leo or Mary rank better in their respective groups? Explain your reasoning.

(c) What percent of the triathletes did Leo finish faster than in his group?

(d) What percent of the triathletes did Mary finish faster than in her group?

(e) Compute the "cut-off time" for the **fastest 5%** of athletes in the men's group, i.e. those who took the shortest 5% of time to finish.

(f) The "cut-off time" for the **slowest 10%** of athletes in the women's group